

Safety and Implementation of New Single Port Access Techniques in Coloproctology

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Valorisation

An estimate of 13.000 new cases of colorectal cancer are diagnosed every year in the Netherlands alone. One third of all colorectal tumours are located in the rectum. In the Netherlands tumours of the colon and rectum are the third most frequent diagnosed malignant disease in both female and male patients, approximately half of all the patients eventually die from the disease. The introduction of population based screening programmes has led to improved survival and to a shift towards detection of more early stage rectal cancers, with 35% of tumours detected by screening being Dukes stage A versus 14% in a non-screened population. (www.oncoline.nl) Reducing morbidity and mortality together with increasing quality of life of patients is becoming increasingly important in all disciplines of surgery. This awareness led to the development of minimally invasive surgical access and resection techniques in colorectal surgery.

This thesis aimed to further investigate the safety and implementation of two minimally invasive single port access techniques, the first technique is transanal minimally invasive surgery for the resection of early stage rectal cancer. The second technique is single access port restoration of intestinal continuity thru the formal ostomy site.

Scientific relevance

Total mesorectal excision(TME) remains the golden standard for the treatment of rectal cancer. This technique yields good oncological result, for early stage rectal cancer 2% experience local recurrence and 12% of the patients develop distant metastasis. Unfortunately, this technique is associated with significant short- and long-term morbidity. Anastomotic leakage occurs in approximately 15% of the patients. Radical resection requires permanent stoma formation in 10% to 20% of cases and temporary stoma formation in 60% to 70%, a great amount of these temporary stomas will never be reversed. Over 50% of all patients following TME surgery experience some form of fecal incontinence, urinary problems and or sexual dysfunction. Furthermore, TME surgery is associated with poor patient reported quality of life outcomes.

TME surgery for early stage rectal cancer results in overtreatment and unnecessary high morbidity rates. This insight led to the adoption of organ-sparing treatment strategies with significantly less morbidity and mortality, with good oncological outcomes. Chemo-radiation therapy followed by local excision or watchful waiting shows promising results. However, questions remain regarding the optimal radiotherapy schedule, chemotherapy dosage and timing for effect evaluation. Another organ-sparing treatment modality is local excision of early stage rectal tumours. Transanal endoscopic microsurgery(TEM) allows for rectal saving with low morbidity and mortality and minor, often temporary,

fecal incontinence. Careful tumour and patient selection is paramount for this approach. The relative high cost and long learning curve of TEM led to the development of transanal minimally invasive surgery technique (TAMIS). Scientific data on this topic is scarce.

This thesis further explored the benefits of implementing this new single port access technique in a large teaching hospital in the Netherlands. We've proven that this technique is safe with minor (temporary) negative effects on fecal continence, induces no invalidating effects on quality of life and has a shorter learning curve than TEM. Furthermore, we published encouraging data on salvage TME surgery after TAMIS.

Patients with stomas face many physical and psychological challenges, including leakage, skin rashes, lifestyle alterations and sexual dysfunction. However, restoring the intestinal continuity after (end)colostomy formation is considered a difficult operation that is associated with a high morbidity rate, with anastomotic leakage rates range from 4 to 16% and an operative mortality reported as high as 10%. In patients undergoing end colostomy formation for complicated diverticulitis, morbidity and mortality rates can be as high as 30 and 14%, respectively. The high incidence of morbidity and mortality is the main reason why surgeons are reluctant to restore intestinal continuity in approximately 40% of the patients that underwent end colostomy formation.

With the knowledge gained in the first part of this thesis, we continued our quest for techniques to reduce surgical trauma. We further developed a technique, scarcely reported on in literature. By utilizing the forma colostomy orifice as an entrance for our single port access system we showed restoration of intestinal continuity can not only be attained in patients that were considered unsuitable for restoration in the past, but also with less severe complications due to the minimal need for adhesiolysis and shorter hospital stay.

This research will provide scientific data that will facilitate surgeons in informing their patients correctly before undergoing TAMIS for their early stage rectal cancer and enable them to select the most appropriate minimally invasive technique for the take down of the colostomy.

Societal relevance

The expected increase of early stage rectal cancer in the near future makes developing new surgical techniques, for the treatment of these cancers in particular, of vital importance. Results of this thesis are relevant for patients with newly diagnosed well differentiated T1-2 low rectal cancers. In the Netherlands alone there are an estimate of

30.000 people with a (temporary)ostomy, annually 7000 new ostomy owners can be added to this total amount. (www.stomavereniging.nl) Therefore, this thesis is also relevant for all these patients. Furthermore, this thesis is relevant for the physicians and multidisciplinary teams treating all these patients in order for them to make a well-balanced decision. Finally, the techniques described in this thesis will reduce surgical morbidity and mortality by being as minimally invasive as possible without compromising (oncological)outcomes, these techniques will result in a shorter hospital stay and will therefore have an effect on health care costs. Lastly, we postulate that patients treated with both techniques will resume their daily work faster, with fewer patients being incapacitated, making this thesis economically and political relevant as well.

Innovation and future

We believe the foundation of future colorectal surgery should be built on ‘maximizing quality of life’. Two main ingredients are needed to make this possible, namely: minimally invasive access techniques and organ sparing treatment solutions. The introduction of the single access platform made natural orifice surgery (as described in this thesis) possible. Expertise gained by using the TAMIS technique, led to the development of transanal total mesorectal excision (TaTME) and robotic-assisted transanal total mesorectal excision (RATS-TME). These promising techniques are relatively new and experimental but aim to maximally reduce surgical access trauma. Future studies together with the development of more advanced robotic platforms should help us to define the role of these single access techniques in the treatment of colorectal cancer.

Organ preservation, in this case rectal-sparing strategies may generate significantly less morbidity and improve quality of life of patients with rectal cancer. Promising outcomes for chemoradiation therapy followed by watchful waiting or local excision have already been published. The START-TREC study will establish the risk, complication rate and advantages of rectal-sparing treatment using (chemo)radiotherapy followed by selective local excision.

Regardless of technique, however, the primary goal of surgical treatment of rectal cancer remains oncologic cure with compromising quality of life as little as possible. We should not forget that!